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McCarthy discloses an enclosure 10 having a top chamber 12, a card cage 14, and an open bottom chamber 16. Card cage 14 can receive a plurality of electronic modules or cards 18a-18k. Only power supply module 18a is enclosed, whereas, there are ten unenclosed cards 18b-18k. Indeed, cards 18b-18k are "circuit boards". On the other hand, power supply module 18a "is enclosed in metal so that EMI/RFI emissions are not leaked into the card cage, the power supply module 18a is isolated and doesn't contribute to the need for a Faraday shield. As such, enclosure 10 isolates power supply module 18a in order to prevent leakage of EMI/RFI into card cage 14. Further, since "the power supply module 18a is separately shielded, the openings 55 in grid 54 are larger than the openings 56 in the grid underlying the modules or cards 18b through 18k. Because there is no source of EMI/RFI emissions adjacent the openings 55, these openings are slightly larger than openings 56 to allow greater air flow." Col. 5-6.

However, McCarthy fails to teach, advise, or suggest an integrated modular avionics (IMA) cabinet having "a plurality of printed circuit board (PCB) modules" and a chassis, "wherein said plurality of printed circuit board modules creates a seal with said chassis" as recited in claims 1, 23, and 24 (and claims 2, 13, 16, 17, 19, and 20, which variously depend from claim 1). In addition, McCarthy fails to teach, advise, or suggest where "each PCB module is enclosed" as recited in claims 1 and 24 (and claims 2, 13, 16, 17, 19, and 20, which variously depend from claim 1).

No where does McCarthy disclose "a plurality of printed circuit board (PCB) modules". McCarthy clearly discloses only one enclosed module, namely, power supply module 18a, and not a plurality of printed circuit board (PCB) modules. Further, no where does McCarthy disclose where the plurality of electronic modules or cards 18a-18k creates a seal with card cage 14. Electronic "modules" or cards 18b through 18k are merely unenclosed cards. As such, "module" as used in McCarthy refers to both enclosed power supply "module" 18a and cards or "modules" 18b-18k. No where in McCarthy is there a seal created between the plurality of electronic "modules" or cards 18a-18k and card cage 14. To the contrary, power supply module 18a is itself isolated to prevent leakage of EMI/RFI.

Also, McCarthy also fails to teach, advise, or suggest where "each PCB module includes a faceplate and a connector assembly disposed opposite said faceplate" as recited in claim 1. Rather, card cage 14 in McCarthy has a back panel 40 made of sheet metal behind a backplane 38. Backplane 38 is "for connection of the electronic modules or cards 18a-18k". In this way,



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backplane 38 is not a part of electronic modules or cards 18a-18k, but simply a way for electronic modules or cards 18a-18k and back panel 40 to connect. Thus, each of electronic modules or cards 18a-18k fails to include "a faceplate and a connector assembly disposed opposite said faceplate" as recited in claim 1. Col. 5.

Further, McCarthy fails to teach, advise, or suggest where each of the plurality of PCB modules includes a "face plate having a first end and an opposite second end", "a first screw for attaching said first end of said face plate to said chassis", and "a second screw for attaching said second end of said face plate to said chassis" as recited in claim 2. Rather, McCarthy discloses a switch 110 having "a front plate 122 which has two protrusions 124 and 126 which extend through apertures 128 and 130 in the front plate of card 18". "A large screw hole 116 is also in the card guide 32... A screw 118 fits through aperture 120 in the front of the card 18 and into the screw hole 116." The switch 110 assembly and the card guide 32 assembly are used to remove the entire module or card 18 from enclosure 10 without affecting the other cards (when switch 110 is in the off position). As such, front plate 122 is not a part of "modules" or cards 18a-18k. In addition, the various screws in McCarthy do not attach face plate 122 to card cage 14, but rather attach front plate 122 of switch 110 to card 18.

Still further, McCarthy fails to teach, advise, or suggest where "said ventilation holes are sized to be resistant to electromagnetic interference (EMI) and to radio frequency interference (RFI)" as recited in claim 17. As discussed above, power supply module 18a is enclosed in metal to prevent leakage of EMI/RFI into card cage 14. Accordingly, openings 55 and 56 are for air flow only, where "there is no source of EMI/RFI emissions adjacent the openings 55".

Accordingly, Applicant respectfully submits that each and every element of the claims are not disclosed by McCarthy, and therefore not anticipated by McCarthy. Therefore, Applicant respectfully requests the withdrawal of the rejection of claims 1, 2, 13, 16, 17, 19, 20, 23, and 24 over McCarthy.

35 U.S.C. § 103 REJECTIONS

Applicant respectfully believes that the § 103 rejections contained within the Office Action are now moot, since they apply to claims that depend from allowable independent claims, and are therefore patentable *a fortiori*. Nevertheless, Applicant further distinguishes the references as follows:



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Claims 14, 15, and 18

The Examiner rejected claims 14, 15, and 18 under 35 U.S.C. § 103(a) as being unpatentable over McCarthy. Applicant respectfully traverses this rejection.

McCarthy fails to teach, advise, or suggest where "said top panel and said bottom panel [of the chassis] are interchangeable" as recited in claim 14 or where "said first side panel and said second side panel [of the chassis] are interchangeable" as recited in claim 15. The Examiner argues that "a part of the cabinet may be relocated without modification to the operation of the cabinet", so that "such a relocation is considered to have been within the skill of art (citing In re Japikse 86 USPQ 70 (1950)). No where does McCarthy discuss the separate panels having interchangeability. Indeed, top chamber 12 is distinguished from "open" bottom compartment 16 indicating they would not be interchangeable. In this manner, McCarthy teaches away from the claimed invention by suggesting that the top and bottom chamber and compartment are distinguishable and unique. Furthermore, it is evident that where two elements are identical in McCarthy, it is so indicated. For example, wave or card guide 30 and identical mirror image wave or card guide 32 are so indicated.

McCarthy also fails to teach, advise, or suggest where "said ventilation holes are less than about 0.09 inches in diameter" as recited in claim 18. The Examiner argues that it would have been an obvious matter of design choice to make the holes as small as possible in diameter to reduce the amount of space. The Examiner further alleges that a "change in size is generally recognized as being within the level of ordinary skill in the art" (citing In re Rose, 105 USPQ 237 (CCPA 1955)). However, the size of the holes was carefully considered in McCarthy as follows:

Because there is no source of EMI/RFI emissions adjacent the openings 55, these openings are slightly larger than openings 56 to allow greater air flow... the size of each of the openings 55 is approximately 11.75 mm X 18.7 mm and 11.9 mm deep... The size and depth of the openings 56 are chosen to balance the functional requirement of providing a Faraday shield preventing RFI/EMI emissions and yet permitting sufficient air flow through the card cage to dissipate the heat generated by the electronics without causing acoustic noise. Col. 6, lines 25-44.

As such, the holes were not merely chosen to be as small as possible to save space, but rather to balance the functional requirements of a Faraday shield and sufficient air flow. Accordingly, no where does McCarthy teach, advise, or suggest where "said ventilation holes are

less than about 0.09 inches in diameter” as recited in claim 18. Thus, McCarthy fails to teach, advise, or suggest the missing claimed elements, so that claims 14, 15, and 18 would not have been obvious over McCarthy.

Claims 3-5

The Examiner rejected claims 3-5 under 35 U.S.C. § 103(a) as being unpatentable over McCarthy in view of Craker, U.S. Patent No. 4,716,497, issued December 29, 1987 (“Craker”). Applicant respectfully traverses this rejection.

Craker discloses a printed circuit board module 10 having a first printed circuit board 12, a frame 14 parallel to the printed circuit board 12, and a front faceplate panel 22. The frame 14 consists of a central connecting member 16 and two legs 18 and 20 to form a C-shaped frame. The panel 22 of the module is fastened to the ends of the frame legs 18 and 20 and the first printed circuit board 12. Although Craker teaches a mounting bolt 60 to attach front face plate 22 to a cabinet, it does not teach that the mounting bolt is a jack screw. While the bolt 60 holds the face plate 22 to the electronics cabinet, it also functions as an electrical connection providing power to digital displays on the face plate. As shown in figure 4, the mounting bolt passes through a compression spring 76 and ground strap 68 to provide an “electrical connection” “to both the printed circuit board and the frame”. Col. 4, lines 56-59. Craker also teaches that the mounting bolt “is fastened to the printed circuit board enclosure to hold the module in the enclosure”. Col. 4, lines 55, 56. In other words, the mounting bolt is pulling the module to the chassis and providing an electrical connection.

In contrast, a “jack screw” is a mechanical device, where a screw applies a certain amount of force to lift or push a load. Accordingly, Craker does not teach that the mounting bolt is a jack screw or that any amount of force is applied by the screw to clutch or hold the module to the chassis. As such, McCarthy in view of Craker fail to teach, advise, or suggest a first screw “configured as a jack screw” as recited in claim 3, first and second screws “configured to clutch when said screws are tightened to apply a predetermined amount of force between said face plate of the PCB module and said chassis” as recited in claim 4, or where a “predetermined amount of force applies a load of about 70 pounds per screw” as recited in claim 5. McCarthy in view of Craker fail to teach, advise, or suggest one or more of the missing claimed elements of claims 3,

4, and 5. Therefore, claims 3, 4, and 5 would not have been obvious to a person of ordinary skill in the art, so that claims 3, 4, and 5 are patentable over McCarthy in view of Craker.

The Examiner further alleges that McCarthy and Craker disclose the claimed invention except for the predetermined amount of force is about 70 pounds per screw. The Examiner argues that it would have been obvious to one having ordinary skill in the art at the time of the invention to apply the force to fasten the screw on the module for securing the module within the cabinet, because discovering an optimum value of a result effective variable involves only routine skill (citing In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980)).

However, Applicant submits that the cited art of record contains no teaching, suggestion, or motivation to combine the references as proposed by the Office. See ACS Hosp. Systems, Inc. v. Montefiore Hosp., 732 F.2d 1572, 1577 (Fed. Cir. 1984) (teachings of the prior art can be combined to show obviousness only if there is some suggestion or teaching to do so). Accordingly, the Office is impermissibly using hindsight reasoning in an attempt to recreate the claimed invention with Applicant's disclosure as the basis. Thus, without using impermissible hindsight reasoning, it would not have been obvious to one of ordinary skill in the art at the time of the invention to modify McCarthy and/or Craker to include the missing claimed elements. Regardless, McCarthy in view of Craker fails to teach, advise, or suggest the missing claimed elements. Therefore, claims 3, 4, and 5 are patentable over McCarthy in view of Craker.

Claims 6, 7, and 9-11

The Examiner rejected claims 6, 7, and 9-11 under 35 U.S.C. § 103(a) as being unpatentable over McCarthy in view of Craker and further in view of Martin, U.S. Patent No. 5,424,916, issued June 13, 1995 ("Martin"). The Examiner alleges that Martin discloses "a module (30) having first and second printed circuit boards (32-34-figure 2) connected to a connector assembly (50) with 90 degrees lead and without using ribbon cables". In addition, the Examiner argues that it would have been obvious to one of ordinary skill in the art at the time of invention "to modify the cabinet of McCarthy and Craker and provide the module having more than one circuit board connected to the connector assembly as taught by Martin in order to reduce a connection between two boards and backplane connector of the cabinet". Applicant respectfully traverses this rejection.

Martin discloses a combination conductive and convective heatsink for use in an electronic module. A heatsink member 10 includes first and second major planar surfaces 12 and 14, respectively. Adjacent surfaces 12 and 14 is an object from which heat is to be transferred, where the object is an electronic circuit board. The conductive and flow-through heatsink uses heat pipes 18a-18d and 23 with flow-through passage areas 20a-20e. Heat pipes 18a-18d and 23 are used to conduct heat from surfaces 12 and 14 to a mounting rack 42. For example, heat pipe 18b is a conventional heat pipe having wicking material 22 located on the inner surface of the pipe. Alternatively, solid heat pipe 23 has carbon fibers 24 oriented to conduct heat from surfaces 12 and 14 to mounting rack 42. Conductive and convective heatsink 10a is used with electronic module 30 having first and second electronic circuit boards 32 and 34. Electronic module 30 is mounted in mounting rack 42 having side walls 41 and 43, motherboard 44, and connectors 46a-46c. A "recess 48 guides electronic module 30 into mounting rack 42 until electronic module connector 50 and connector pins 51 engage and mate with mother board connector 46b". Col. 4 to Col. 5.

Accordingly, Martin fails to teach, advise, or suggest a PCB module having "a first circuit board having a first end connected to said face plate and an opposite second end connected to said connector assembly; and a second circuit board having a first end connected to said face plate and an opposite second end connected to said connector assembly" as recited in claim 6. Martin also fails to teach, advise, or suggest a PCB module having a connector assembly where "said connector assembly further comprises a plurality of connectors for connecting to wire harnesses" as recited in claim 7 (and claims 9-11, which variously depend from claim 7).

The "module" in Martin (i.e., electronic module 30) works with conductive and convective heatsink 10a. The first and second electronic circuit boards 32 and 34 of electronic module 30 are placed on either side of conductive and convective heatsink 10a. Electronic "module" 30 consists of two circuit boards, namely, first and second electronic circuit boards 32 and 34, electronic module connector 50, and connector pins 51. In this way, electronic module 30 and heatsink 10a slide into recess 48. McCarthy discloses an enclosure 10 having a top chamber 12, a card cage 14, and an open bottom chamber 16. The card cage 14 can receive a plurality of electronic modules or cards 18a-18k. As discussed above, electronic "modules" or cards 18b through 18k of McCarthy are merely unenclosed cards. As such, attempting to insert

the electronic module 30 and heatsink 10a of Martin into the openings for receiving electronic modules or cards 18a-18k in McCarthy would render McCarthy inoperable for its intended use. The electronic "modules" or cards 18b through 18k are merely unenclosed cards and not bulky electronic module 30 and heatsink 10a as shown in Figure 2 in Martin. Accordingly, McCarthy teaches away from Martin in connection with the definition of "module" and, consequently, how the electronic module 30 and heatsink 10a would fit into the cabinet or enclosure. The electronic module 30 and heatsink 10a of Martin could not fit in the space made for the "module" of McCarthy (namely, a space for a card). Thus, McCarthy teaches away from Martin, and attempting to modify McCarthy with the electronic module 30 and heatsink 10a of Martin would render McCarthy inoperable for its intended use.

Regardless, Applicant submits that the cited art of record contains no teaching, suggestion, or motivation to combine the references as proposed by the Office. See ACS Hosp. Systems, Inc. at 1577 (teachings of the prior art can be combined to show obviousness only if there is some suggestion or teaching to do so). Accordingly, the Office is picking and choosing the various missing claimed elements in an attempt to recreate the claimed invention with Applicant's disclosure as the basis. Thus, without using impermissible hindsight reasoning, it would not have been obvious to one of ordinary skill in the art at the time of the invention to modify McCarthy in view of Craker and in further view of Martin to include the missing claimed elements. Regardless, McCarthy in view of Craker and in further view of Martin fails to teach, advise, or suggest the missing claimed elements. Therefore, claims 6, 7, and 9-11 are patentable over McCarthy in view of Craker and in further view of Martin.

Claims 12 and 21

The Examiner rejected claims 12 and 21 under 35 U.S.C. § 103(a) as being unpatentable over McCarthy in view of Craker and further in view of McKenzie, U.S. Patent No. 4,002,386, issued January 11, 1977 ("McKenzie"). Applicant respectfully traverses this rejection.

The McKenzie reference discloses a handle, which locks in place to prevent it from pinching fingers against the printed circuit boards since there is no face plate covering the PCB. As part of the locking mechanism, a plurality of pulling pins are disclosed that interact with slots in the handle to keep it in a locked position. However, McCarthy in view of Craker and in further view of McKenzie fails to teach, advise, or suggest a face plate having "a slot formed

therein", "a flexible handle member having substantially the same dimensions as said slot", where the flexible handle member is "configured to move between a retracted position and a use position", and where the flexible handle member lies within the "slot in said retracted position and said flexible handle member extends out from said slot in said use position" as recited in claim 12. Furthermore, McCarthy in view of Craker and in further view of McKenzie fails to teach, advise, or suggest a retainer member configured to attach the first end of the flexible handle member to the first end of the slot such that the flexible handle member is configured to move between a retracted position and a use position, where the first end of the flexible handle member does not move when the flexible handle member moves between the retracted position and the use position as recited in new claim 21.

Upon careful examination of the cited figures and the accompanying text at McKenzie, col. 2, lines 39-47, it is apparent that the handle is not slideably attached, but rather is attached to pins mounted in the printed circuit board. Slots in the handle move the handle over a pin to a keyhole 50/51 in the slot, which then locks the handle in position. As such, McKenzie teaches a handle arrangement that requires pins to be mounted directly on to the printed circuit board and handle ends, which lock the handle in position. Indeed, the McKenzie reference teaches away from the claimed invention in that the handle in McKenzie is made to lock into position. In addition, modifying the handle in McKenzie to include the missing claimed elements would render McKenzie improper for its intended purpose, namely to lock the handle in position. Consequently, even a combination of McCarthy in view of Craker and in further view of McKenzie fails to teach, advise, or suggest the claimed invention as recited in claims 12 and 21.

Furthermore, Applicant submits that the cited art of record contains no teaching, suggestion, or motivation to combine the references as proposed by the Office. See ACS Hosp. Systems, Inc. at 1577 (teachings of the prior art can be combined to show obviousness only if there is some suggestion or teaching to do so). Accordingly, the Office is picking and choosing the various missing claimed elements in an attempt to recreate the claimed invention with Applicant's disclosure as the basis. Thus, without using impermissible hindsight reasoning, it would not have been obvious to one of ordinary skill in the art at the time of the invention to modify McCarthy in view of Craker and in further view of McKenzie to include the missing claimed elements. Regardless, McCarthy in view of Craker and in further view of McKenzie

fails to teach, advise, or suggest the missing claimed elements. Therefore, claims 12 and 21 are patentable over McCarthy in view of Craker and in further view of McKenzie.

CONCLUSION

The Applicant respectfully submits that the present application is in condition for allowance because all claims patentably distinguish the prior art of record. Reconsideration of the application is thus requested. Applicant invites the Examiner to telephone the undersigned if he or she has any questions whatsoever regarding this Response or the present application in general.

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